Rift Valley Fever

by

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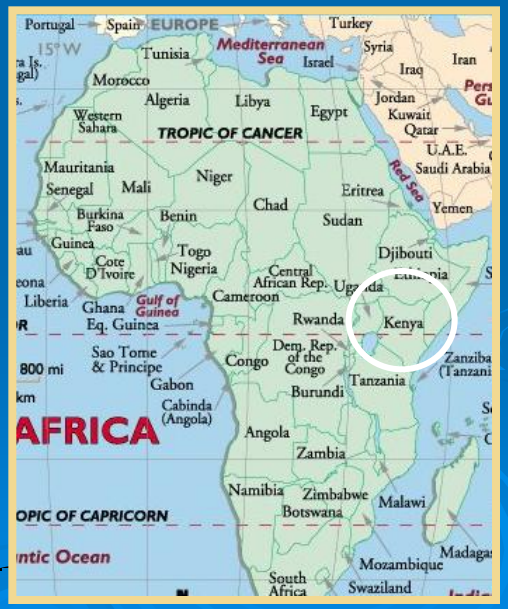
Rift Valley Fever Overview

- Named after outbreak in Kenya
- Acute febrile disease
  - Sheep, cattle, goats
  - High abortion rates and death in young
- Can affect humans
- Heavy rainfalls
- Arthropod vector
  - Most commonly mosquito

Rift Valley – Kenya

- 1900's: First recognized in sheep
- 1930: Agent isolated
- Intermittent outbreaks in Kenya
  - 1950-51, major epizootic
    - 500,000 sheep abortions
    - 100,000 sheep deaths



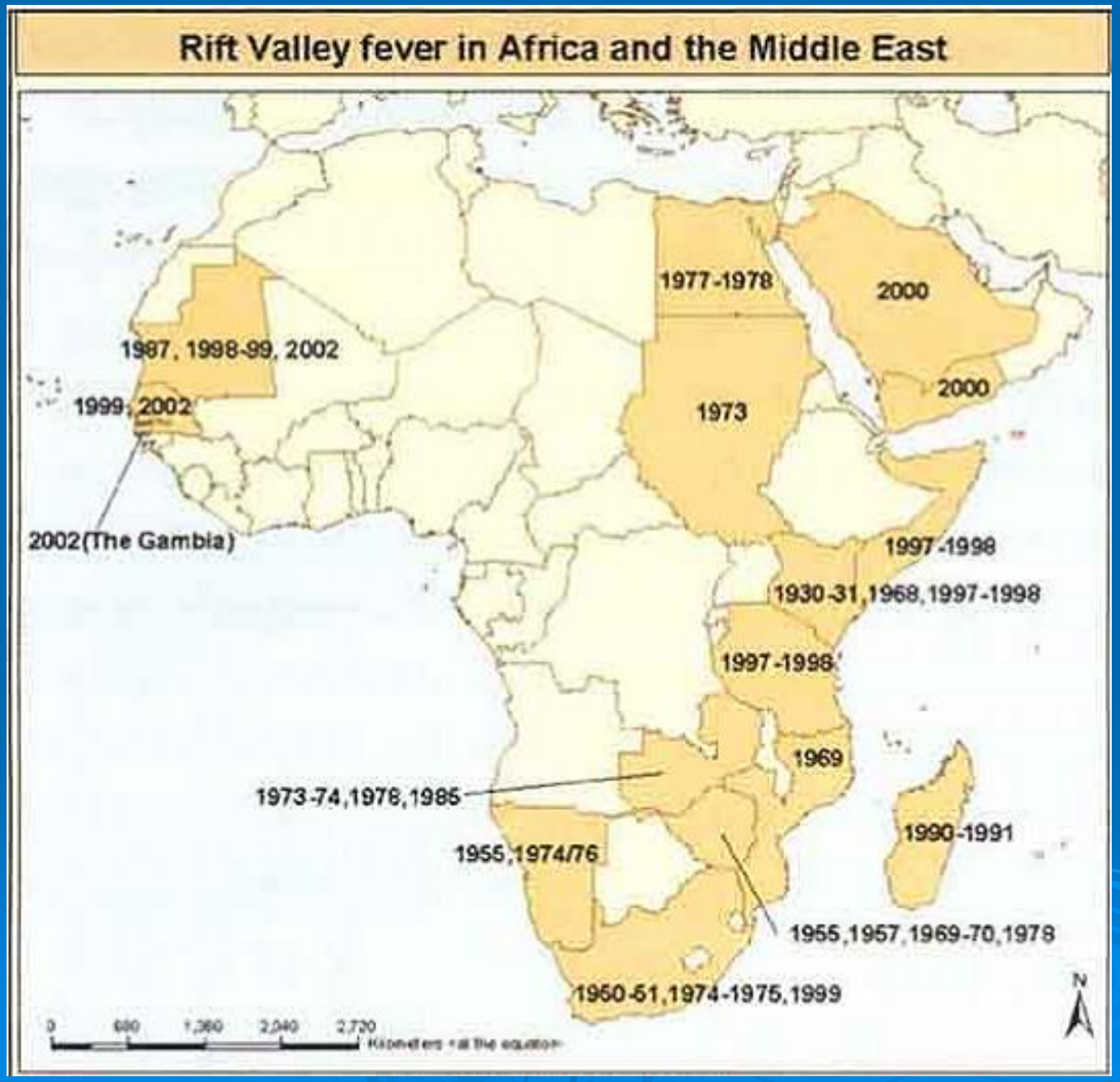
Egypt: 1977-1978

- Humans
  - 18,000 cases
  - 598 deaths
    - Encephalitis and hemorrhagic fever
    - Case-fatality less than 1%
- Ruminants
  - Abortions and deaths
    - Sheep, cattle, goats
    - Water buffalo, and camels

Other Important Outbreaks

- 1987: Senegal, Africa
  - Differed from other outbreaks
    - Not associated with rainfall
- 1997-98: Kenya, Africa
  - Largest outbreak reported
  - 89,000 humans cases - 478 deaths
- 2000-01: Saudi Arabia and Yemen
  - First outbreak outside of Africa

Rift Valley fever in Africa and the Middle East



Current outbreak in Kenya

- Garissa, Wajir, Ijara,Kilifi, Tana River, Malindi, Isiolo, Kirinyaga, Kajiado,and Taita Taveta
- Animal cases in Kitui, Makueni, Mombasa, Moyale, Lamu, Thika, Mwingi and Naiwasha
- More than120 human deaths

Epidemiology

- Endemic in tropical Africa
  - Cyclic epidemics 5-20 year
    - Susceptible animal populations
  - Abnormally heavy rainfalls

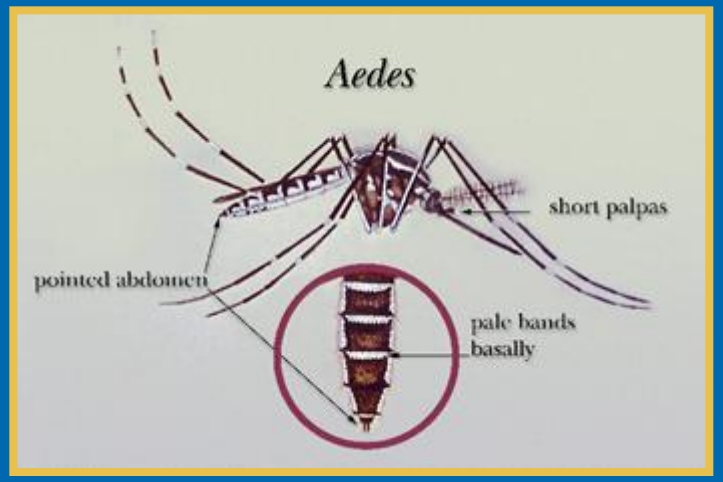
Reservoir

- Mosquitoes – *Aedes* species
  - Transovarial transmission
  - Eggs dormant for long periods
  - Heavy rainfall, eggs hatch

- Ruminant amplifying host
- Secondary vectors can be infected
  - *Culex* and *Anopheles* mosquito species
  - Biting flies: midges, phlebotomids, stomoxids, simulids

Transmission

- Arthropod vector
  - Mosquitoes
    - *Aedes*
    - *Anopheles*
    - *Culex*
    - Others
- Biting flies possible vectors



Other Modes of Transmission

- Tissue or body fluids of infected animals
- Direct contact or aerosolization
  - Aborted fetuses
  - Slaughter
  - Necropsy
- No person-to-person transmission

Human Disease

- Incubation period: 2-6 days
  - Inapparent or flu-like signs
    - Fever, headache, myalgia, nausea, vomiting
    - Recovery in 4-7 days
  - Retinopathy
  - Hemorrhagic fever
  - Encephalitis
- Overall mortality ~1%

Human Disease

- Retinopathy (1-10%)
  - 1-3 weeks after onset of symptoms
  - Conjunctivitis
  - Photophobia
  - Can lead to permanent vision loss
  - Death is uncommon

Human Disease

- Hemorrhagic fever
  - 2-4 days after fever
  - Melena, hematemesis, petechia, jaundice, shock, coma
  - Death
  - Case-fatality is ~50%
- Encephalitis
  - 1-3 weeks after onset of symptoms
  - Can occur with hemorrhagic fever

Diagnosis and Treatment

- Diagnosis
  - ELISA, human blood
  - Demonstration of viral antigen

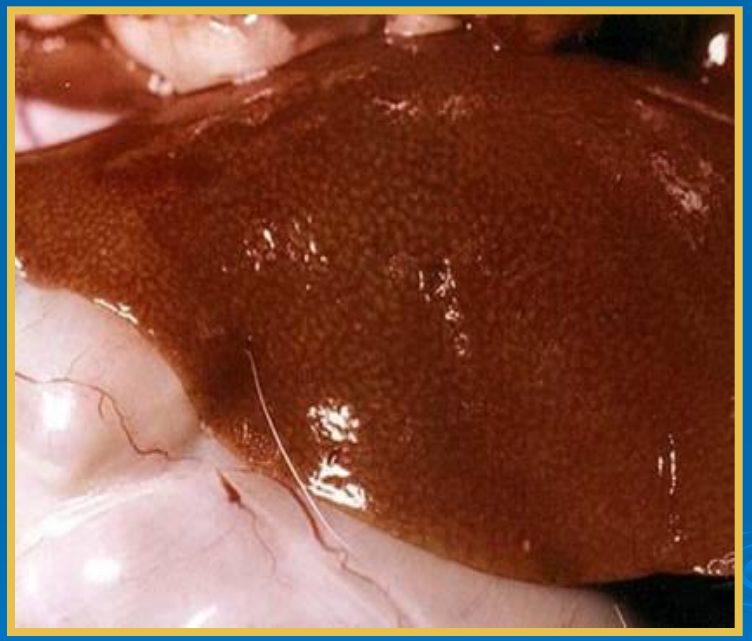
- Treatment
  - Symptomatic and supportive therapy
  - Replacement of coagulation factors
  - Ribavirin may be helpful

Animal Disease

Mortality 100%	Severe Illness Abortion Mortality	Severe Illness Viremia Abortion	Infection Viremia	Refractive to Infection
Lambs	Sheep	Monkeys	Horses	Rodents
Calves	Cattle	Camels	Cats	Rabbits
Kids	Goats	Rats	Dogs	Birds
Puppies	Humans	Squirrels	Monkeys	
Kittens				
Some rodents				

Post Mortem Lesions

- Hepatic necrosis
  - Liver enlarged, yellow, friable
  - Petechial hemorrhages prominent
    - Cutaneous
    - Serosal



Control & Prevention

- Immunization of ruminants
- Avoid and control vectors
- Sleeping under ITNs Personal protective equipment
  - Aborted fetuses, necropsy
- Avoid contact with infected tissues and blood
- Restrict movement of animals
- Precautions when travelling

Rift Valley Fever Vaccine

- Veterinary
  - Live attenuated vaccine (single dose). Causes abortion if given to pregnant animals
  - Killed vaccine (multiple doses). Do not cause abortions
- Human vaccine
  - Inactivated vaccine. Used to protect veterinary and laboratory personnel

THANK YOU!